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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/391,473	09/08/1999	NOBORU KUBO	4930(840)	8652

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EXAMINER

WHIPKEY, JASON T

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/391,473

Applicant(s)

KUBO ET AL.

Examiner

Jason T. Whipkey

Art Unit

2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 10-17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The replacement drawing sheet was received on October 16, 2003. This drawing is approved and the corresponding objections withdrawn.

Response to Arguments

2. Applicant's arguments with respect to claim 1 has been considered but is moot in view of the new ground of rejection.
3. Applicant's argument with respect to claim 4 has been fully considered but is not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, Applicant's suggestion that "the motivation for combining Suganuma with Temes was to allow for the correction of defective pixels" is "the specific problem

addressed by Temes" is without merit. Temes's system corrects pixel non-uniformity only and does not enumerate which pixels are wholly defective. Suganuma's system also corrects pixel non-uniformity but includes the added advantage of identifying pixels that are too defective to be modified by non-uniformity correction alone.

4. Applicant's argument (see page 11 of the amendment filed October 16, 2003) with respect to claim 10 has been fully considered and is persuasive. The rejection of claim 10 has been withdrawn.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3 and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Suganuma (U.S. Patent No. 6,034,794).

Regarding claim 1, Suganuma discloses an imaging system with image sensor 1 ("a solid-state imaging device") with a plurality of photoelectric transducer elements

(column 4, lines 26-35). Sensitivity variation corrector 132 and defective pixel corrector 133 ("a calculation section") correct sensitivity variations in the image sensor by first reading light at two different brightnesses ("varied amounts of light") to produce a characteristic curve ("output characteristics") (column 11, lines 6-18 and 31-36). The same readings are used to locate defective pixels ("a defect in the subject photoelectric transducer") (column 12, lines 49-57). An average of the levels of the pixels preceding and following any defective pixel ("a plurality of photoelectric transducers neighboring the subject phototransducer") is output in place of the signal produced by the defective pixel ("an output corresponding to a non-defective photoelectric transducer") (column 12, lines 43-63).

Regarding claim 2, Suganuma teaches that line memory 151, which is contained in offset level corrector 131 stores image data output from the image sensor (column 10, lines 33-41). As shown in Figure 3, sensitivity variation corrector 132 (part of the "calculation section", as defined above) receives the output of the offset level corrector.

Regarding claim 3, it is inherent that photoelectric transducers produce an output signal corresponding to the amount of light it receives.

Regarding claim 7, Suganuma teaches that an offset level is determined by capturing a completely black subject and a completely white subject (column 10, line 64, through column 11, line 5). Since Applicant does not define the relative term "near-overflow" in the claim, any white subject could read on the claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 4, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Temes (U.S. Patent No. 4,602,291) in view of Suganuma.

Regarding claim 4, Temes discloses a pixel-non-uniformity correction system, as shown in Figure 1. The system includes a memory comprised of offset memory 14 and gain memory 28, which store image signals in response to illumination directed to imager array 10 at light levels X1 and X2, which are detected by imager 10 at levels Y1 and Y2 (column 2, lines 15-19). Arithmetic unit 18 forms a calculation section for

determining constants M and B in the equation $Y = MX + B$, where M is a gain coefficient and B is an offset level (column 2, lines 4-14).

Temes is silent with regard to comparing M and B with predetermined coefficients to determine the presence or absence of a pixel defect and using neighboring pixels to correct for defective pixels.

Suganuma discloses an image sensor signal correction device, as shown in Figure 3. Defective pixel corrector 133 determines whether a particular pixel is defective by comparing a value that is calculated when image sensor 1 is exposed to white light with a predetermined threshold ("predetermined reference photoelectric coefficient a_0 ") (column 7, lines 19-27). Similarly, defective pixel corrector 133 determines whether a particular pixel is defective by comparing a calculated offset with a predetermined threshold ("predetermined reference offset output level b_0 ") (column 12, lines 49-57). An average of the levels of the pixels preceding and following any defective pixel ("a plurality of photoelectric transducers neighboring the subject phototransducer") is output in place of the signal produced by the defective pixel ("an output corresponding to a non-defective photoelectric transducer") (column 12, lines 43-63).

An advantage to differentiating between defective and non-defective pixels is that they may be corrected accordingly — e.g., non-defective pixels could be corrected with a calculated gain and offset, while defective pixels can be corrected by interpolation. For this reason, it would have been obvious at the time of invention to have Temes determine whether each pixel output is defective or satisfactory.

Regarding claim 8, Temes teaches that the amount of light incident upon the imager array 10 is either none (column 6, lines 11-14) or at a "predetermined level" (column 6, lines 15-24). However, Temes is silent with regard to using a level of light that places imager array 10 in a near-overflow state.

Since Temes does not specify the "predetermined level", it would have been obvious at the time of invention to use any light level, such as one that places the imager array in a near-overflow state, especially because the measurement of incident light with a large variation in brightness would produce a more accurate result.

Regarding claim 9, Temes teaches that the amount of incident light may be determined by using the equation $X = [(Y-B)/M]$ (column 2, line 27).

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suganuma in view of Contini (U.S. Patent No. 6,184,529).

Claim 5 may be treated like claim 1. However, Suganuma is silent with regard to using a defocused optical system for calibration.

Contini discloses a uniformity correction apparatus for an imaging system. As stated in column 2, lines 42-48, an advantage to using a defocused optical device when calibrating an imaging device is that a uniform photon flux may be cast upon the imaging device without needing a perfectly uniform illumination device. For this reason, it would have been obvious at the time of invention to have Suganuma include a defocused optical system, such as the one described by Contini.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Temes in view of Sukanuma and further in view of Contini.

Claim 6 may be treated like claim 4. However, Temes is silent with regard to using a defocused optical system for calibration.

Contini discloses a uniformity correction apparatus for an imaging system. As stated in column 2, lines 42-48, an advantage to using a defocused optical device when calibrating an imaging device is that a uniform photon flux may be cast upon the imaging device without needing a perfectly uniform illumination device. For this reason, it would have been obvious at the time of invention to have Temes include a defocused optical system, such as the one described by Contini.

Allowable Subject Matter

12. Claims 10-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 10 and 11, no prior art could be located that teaches or fairly suggests a pixel defect detector that sets a coefficient in the given equation to a median of the outputs of a specific set of photoelectric transducers.

Regarding claims 12 and 13, no prior art could be located that teaches or fairly suggests an image sensor calibration system that detects defective pixels using the given equations.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason T. Whipkey, whose telephone number is (703) 305-1819. The examiner can normally be reached Monday through Friday from 8:30 A.M. to 6:00 P.M. eastern standard time, alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber, can be reached on (703) 305-4929. The fax phone number for the organization where this application is assigned is (703) 872-9306.


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Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center 2600 Customer Service Office, whose telephone number is (703) 306-0377.

JTW

JTW

November 24, 2003


WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600